Agricultural Department.

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PUBLISHER'S NOTICE—All communications intended for this department should be addressed to EDIT. J. P. STELLE, Fort Worth, Tex.

Does It Pay to Irrigate?

Of course it pays in a rainless country, if agriculture pays there at all, for in such country nothing can be raised from the soil without artificial water supply, but the above question is not intended to apply to that kind of country. Does it pay to arrange for irrigation in a country of uncertain rainfall; that is, in a country which may be favored with ample rainfall in the season when needed, and when again may not. There are broad regions carrying this peculiar character, and the only thing working against putting them under a system of irrigation lies in the fact that there may possibly come rain enough to enable the people to get their crops through the season reasonably well without a resort to artificial water supply. The hang-back is not on what will be, but on what may be. The farmer's hopes for best success in such a region are simply hopes founded upon more or less of uncertainty. When a mechanic lays off a job of work he well knows, if he has the required skill and the necessary financial ability, that he will be able to carry it through in exact conformity to the original plans, but not so with the farmer in the region of uncertain rainfall. If the rains happen to come exactly as his plans would have them come he will get to the completion all right, but if, on the other hand, those rains, which no human power can control, happen not to come, he stands a first-class chance of coming out at the little end of the horn, as we say.

This question of irrigation in regions of uncertain rainfall is now justly claiming a good deal of attention, and even "productive Kansas" is about having it forced upon her that irrigation arrangements would pay, and that there is absolutely no safety for her farmers without it.

President Stewart of the Kansas swine breeders' association says the uncertainty of the corn crop, on account of possible drouths, is rapidly driving the people of his state out of the hog business. There were three years of partial corn failure from drouth, which, with the cholera that had preceded it, played sad havoc with the hog interests. Then there came on for 1889 a season of extraordinary plenty. The husbandmen who had sown in faith and hope reaped a harvest so abundant, so overwhelming, so burdensome as it were, that like the disciples, when they took the miraculous draft of fishes, they knew not what to do with it. The hogs that might have consumed it were not there to do the consuming. Everybody was more than satisfied with the crop, and no one seemed to think for a moment that another failure might turn up in 1890, so, since there were not hogs enough to take the great crop, it was simply allowed to go to waste. Why keep it over, seemed to be their reasoning, since we shall have it repeated in 1890? It was sold for a song to anyone who would buy. Speculators bought it at that kind of price, shipped it over to Illinois and had it manufactured into the highest proof whisky that ever flowed from the still. So cheap was the material that there was no end for cutting down the proof. And, furthermore, the farmer of Kansas read his mortgage by the light of his blazing corn. A blind tramp traversing the country could be guided to a farm house by his nasal appendage as he snuffed the odor of burning corn, even as the trained war horse snuffeth the battle from afar. But here is the old drouth again for 1890 worse than ever, and, as a consequence, Kansas is finding herself the home of a set of most extremely panicky farmers, who are spending most of their valuable time cursing Kansas. Once again the great hog crop started in anew last year with such a blast of trumpets is gone for the great crop of 1891, should that great crop happen to come.

And just over yonder in the San Luis valley, of Colorado, where all the lands are under a system of irrigation, sit the people looking towards Kansas with thumb to the nose and fingers expanded. They are all rolling in fatness. If it rains with them let it rain on as long as it pleases to do so—if it don't want to rain, why, just let it don't. Whether it does or whether it don't is all the same to them anyway—they are all solid for the heaviest crop, every season, that the earth can produce, regardless alike to whether or not "the clouds roll by."

Corn production in Kansas, under existing systems, reminds Mr. Stewart, in the light of last year's feast and this year's famine, of an episode in his army life. The command to which he belonged was undergoing a tobacco famine, but was living on daily anticipation of luxuriating in natural leaf or dog-leg when Staunton and Lexington should fall into their hands. Well, the fateful moment arrived, and he played hoosh-scotch with it himself on the streets of Staunton, though no user of the weed. The boys fairly loaded themselves down with tobacco. They got so much that they didn't know what to do with it, so in the after march they pelted each other in a playful kind of way with 82 plugs, tramping them under feet as they passed along. They seemed to think that from that hour on the whole world would be composed of tobacco. But there came a sad day of reckoning. Two weeks had scarcely dragged along ere every tobacco-chewer in the command—save a few long-headed chaps who carried knap-sacks—were besieging the sutler and paying the fabulous prices entailed by their prodigality. That's how the farmers are in Kansas to-day. The corn that they confidently expected for the next year didn't materialize. And as to the hogs: Last year anything that wore bristles was looked upon as a mine of wealth, and the demand for stock continued unprecedented until the absence of rain this year ruined all prospects of a crop. Then the exodus to the stock yards began. Stock hogs, animals half fat and breeding sows made up the mournful procession.

The breeder of thoroughbreds looks with grave misgivings on this condition of things—it presages no good for him. In many places he must follow the example of his neighbors or nerve himself to the task of converting his fine high-priced breeding stock into porkers, and then perhaps at the enhanced price of corn sell them at a dead loss. To men so situated there is no remedy to be prescribed that will promise immediate immunity against loss.

The unripe hogs, says Mr. Stewart, that are being crowded upon the over-burdened market will leave Kansas an aching void which it will be impossible to fill later on. No comment is necessary. The whole and only trouble with Kansas lies in her want of a regular water supply to crops. The lesson taught is this: Every region of uncertain rainfall ought to arrange for irrigation, in case of need, every acre of land that can be brought under the system. But it costs something to arrange a complete system of irrigation. True; but wouldn't heavy and regular crops pay as well in Kansas or Texas, or in any other section of irregular rainfall as they pay in California, or Mexico, or Peru, or Chili or along the Mediterranean where crops cannot be at all expected without irrigation? The heavy crops are what we are after, and irrigation secures them, in any case. If the needed rainfall comes we save the cost of artificial water application—if it happens not to come we have it within our power to save the crop and make it everything that a crop in its line could possibly be.

Why We Advocate Irrigation.

Persons at a distance who see THE GAZETTE, and who know little of Texas, might jump to the conclusion from reading the much we are saying from time to time, in favor of irrigation, that, in our opinion, irrigation is an absolute necessity for the Lone Star state. Any such jump would be simply a jump entirely wide of the mark. We'd like to see lots of irrigation in Texas, not from any thought that Texas couldn't always stand at the very top of the ordinary agricultural pot without it, but because we wish to see her as far in the lead of all other states, agriculturally, as she now stands in point of natural advantages, and this is certainly saying a very great deal. In a word, it is our ambition that Texas should make the fullest possible use of all her natural gifts. We say "Texas is great," and the claim is well founded in every respect, but too many persons, because of our comparative non-development as yet in the interior, decide that we refer to her size. In that respect the position taken is a correct one, of course, but it does not at all represent what we are after. Cut Texas up into Rhode Islands, if you please, for the sake of getting at a clear understanding of the case, and still, if we take the fullest advantage of everything that a beneficent Creator has placed within our ease reach each Rhode Island of the association will yet stand out conspicuously before the world as a "Great Texas."

No, irrigation is not at all a crying necessity in Texas agriculture—it simply offers a great advantage. We have within our borders scarcely an acre of land that might not, under proper management, be made to produce a big crop of some kind or other in each season, without regard to the natural rainfall. Of course some judgement must be exercised as to the kind of crop to put in with a view to meeting possible emergencies. The past season, as the reader well knows, has been a season of extreme drouth, and Northern Texas is understood to have suffered her full share from its effects, yet we'll venture to say that we can show, within less than two miles of the Fort Worth courthouse a 100-acre cotton field that has made this year, all without irrigation, a better yield of the fleecy staple than has been made by any other field of like acreage outside the state of Texas. We eat, furthermore point out large corn fields within the same circle, and say as much for them, after which we can throw in as still within the same circle, 500 or 600 acres of meadow lands which have this year, and without irrigation, yielded in first-class hay double the quantity yielded by a like acreage in any of the so-called bay states above the old line of Mason and Dixon.

So, you see, our advocacy of irrigation for Texas is born of no strait so far as relates to agriculture on the old plans, but rather of the full conviction that while we are able to do what the people of most other states would consider more than really well without it, we could do far better with it. An agricultural people, no matter how well they may be doing, owe it to themselves to get from their lands all that those lands can be made to yield. That's business. Irrigation would enable us to go largely and profitably into such a diversity of crops as we can not now safely venture upon. Irrigation would secure to us all advantages for entering extensively into the production of fruits and vegetables, a character of production not now cutting any particular figure upon our list as articles of commerce. Other less favored regions are beating us in that particular line, and irrigation alone is the instrument enabling them to do it. Irrigation would make all our crops sure and heavy, and would assist us to keep some profitable product growing up to the very best there is in it the whole year round. Under a good system of irrigation there would be no call for lands lying idle half the season at least. They could be pushed all the time, and the reasonable man planning for big money to himself in agriculture must be able to see the need of such pushing. A large and valuable farm running on half time is precisely on a par with a large factory running on half time. The owner is not out much while the factory is not running, for there are no hands to be paid and no materials for working to be purchased, but where is any income during that time. The taxes must be paid all the same, and since men don't live forever in this world the time lost to profit in his short allotment ought to be considered as amounting to something in dollars and cents. We well know that the farmer has a better way of getting around that kind of thing to the soothing of his soul than has the manufacturer, but is it not just possible that those soothings are based upon imperfect information? He says his fallow lands are improving in quality—how? There never was a greater humbug flaunted in the face of intelligence than that fallow-improving theory. Where does the improvement come from? Scientists are now pretty well united in the opinion that plants do not feed from the air. Their leaves are simply their digestive organs, and the food those leaves digest must be taken up from the soil. If the land gets better by lying idle that betterment condition can come only of the fact that a crop of worthless weeds left upon it has given it more humus than it would have secured had a crop been grown and removed. All that the weeds contain had to come directly from the soil—not an atom could have come from any other source. They call it "resting the soil," but under a growth of weeds the soil really has no more rest than it would have had under some crop profitable to the owner.

Give back to your soil in some form or other the vegetable matter you take from it in crops and it wants no "rest." In that case allowing it to lie in idleness for a time to grow up in and seed itself to noxious weeds would be simply the noxious seeding against you. If your crops removed are too much exhausting your mineral elements of plant-food on must return them by some outside means. Your "rest" and consequent weed growths can do nothing whatever for you in that direction. Leaving the noxious seeding out of consideration, you may claim for your weeds that they are advantageous in converting a portion of your elements already in the soil into an element of different character, thus filling a want. You can reasonably claim nothing more. The weeds are converting your mineral elements into humus at the expense of the soil so far as relates to those mineral elements. This is a correct showing up of the whole matter, and you can make nothing else out of it.

Now, let us look upon this thing for a moment from another standpoint. We will presume that you can raise upon your land a crop of something that will net you $100 to the acre. You then allow the land to lie idle for recuperation, as you call it, through time enough to have netted you, under advantageous cultivation, $100 more. Every item of humus that your land could possibly have gathered from its weed growth in the course of that "rest" might have been placed upon each acre by you from some outside source at a cost of $5 to the acre. Those outside materials would have contained all the mineral elements that your weeds could have contained, with this difference: Your weeds got it from your own soil, while the matter obtained by you from some outside source got it somewhere else. In the application of such vegetable matter as your weeds would have afforded, you also added to your mineral elements of plant food, while had you depended upon your growth of weeds in a "rest" of your lands, you would have gained nothing whatever in the way of mineral elements. In a word, the whole long and the whole short of the matter, when you leave your land idle for recuperation, amounts to just about this: Supposing the yield of your land to be $100 net to the acre for a single crop, you pay, by allowing it to pass one crop for recuperation, more than $95 for what you might give it at an outlay of only $5. How is this when we come to take the matter home in a business kind of consideration.

Farming in Texas, while now as profitable as farming in any other section of the country, generally speaking, might be made the most profitable business known to the world; but in order to get it up that way Texas farmers must run on full time. This they cannot well do without irrigation, and that's why we advocate irrigation for Texas. A knowledge of the extent to which correct irrigation can be inaugurated in our state is, as yet, in its infancy, but already our able scientists have demonstrated that at least three-fourths of the commonwealth may be placed under the system. If placed under the system, as shown that it could be, our possible productiveness would increase fully two hundred fold above what it is at present. This may sound as a bugbear to those men among us who are worrying themselves to death about what they term our already over-productiveness. There is no such thing as over-productiveness. Where there is something to consume you will always find somebody ready to consume it. The only trouble at present lies in uncertainty of something to consume. Give the world to understand that Texas can produce two hundred fold in an agricultural way above what she is now producing and two hundred fold of consumers will hurry here to fatten up on those products. Never fear. A general move all along the line will invariably bring on a general move all along the other line. The world works for equilibriums. If in one section of the world there is more to eat than the denizens of that section stand in need of new denizens will be promptly added to make use of it. Where the beechnuts grow in greatest profusion, there are to be found the myriads upon myriads of wild pigeons, though not another wild pigeon may be seen in the beechless regions round about over an extent measuring thousands of miles.

After the Vultures.

We have already had something to say in these columns about a certain school of agricultural writers who see only the bad side of everything. They appear to think that unless they can write up the shortcomings of somebody, or specially point out the defects of some locality, they have nothing worth writing about. Like the vultures of the air that we call by another common name in America, they are always on the alert for "something dead." Live meat is entirely out of their line, so they quietly sail over everything lively without deigning so much as a passing notice, and devote the whole of their energies to a search after meat of the other kind.

Now, if these members of the Cathartidæ family in agricultural literature would take all sides along with them as they go, no reasonable man could find ought to say against their performance. We are entirely willing for the whole truth to be told, but this way they have of seeing and ventilating only the bad side, leaving the impression that no other side exists, cannot do otherwise than make one tired. And even did they do only this it wouldn't be near so bad as it is, but unfortunately they do not always hold up on the sure enough dead carcasses they are able to spy out with all their peculiar alertness—if it happens to be a bad year for finds in their line, they often fall to work and create them to order, out of nothing, in volume sufficient to meet their characteristic purposes.

Mr. B. V. Sowders of Limestone county, Texas, is out with a sharp stick after some of these vulturine literary birds, through the latest issue of the Chicago Prairie Farmer. He says he has taken the Prairie Farmer one year and likes it very well, yet he must confess that some of its Southern correspondents surprise him with their settings forth of the modes of farming in the South, such as plowing exclusively with cows and four hundred pound ponies, single, and with their assertions that double teams are entirely absent. "I have been raised in the South," he says, "and am fifty-two years old. I have been in five Southern states, and yet I have never witnessed any such sights. If there is really any such plowing going on in the South it must be in the isolated exception—I know it is not the rule as these correspondents would have it appear. It is true that we may not have the amount of fine stock here that we should have, and might have, neither may our people be interested in fine stock as they ought to be, but this interest is growing rapidly, and our Spanish stock is giving place to English Shires, Clydesdales, Humbletonians, Percherons, Cleveland bays and other fine breeds.

"The single team idea is incorrect; double teams are almost exclusively used in preparing the land and first cultivation. We use the very best farming implements that are made in the United States. Sulky plows, cultivators, harrows, turning plows, combination plows, gang plows, and heel and solid sweeps, all of the very best material and pattern. We cultivate as much land and make as much to the hand as any people on the globe. There are better farmers in Texas than I am, yet I manage to get along reasonably well, raising for the season, with only one hired hand, 1000 bushels of corn, 800 bushels of oats, 200 bushels of wheat, 400 bushels of sweet potatoes and twenty bales of cotton; also a home garden full of vegetables. This may be accepted as my report for 1890. Two double teams did all the cultivation; no fertilizer used. Ordinary seasons require more hands to gather the crop than to grow it."

The agricultural literature Cathartes aura who sail about over the country would never have seen such live operations as Mr. Sowders refers to. Should it have so happened that Mr. Sowders had a few hundred acres of land lying idle outside of his plantation proper the fellows would probably have given him, through the press, a passing rap over the knuckles about his "unworked and profitless acreage."

The Road Question.

The practical farmer says there is more in the road question than not a few persons might suppose at first thought. Good roads save horseflesh and vehicles, bad roads wear out both. Good roads are the exception in this country and bad roads the rule. In the winter and early spring portions of our country are almost inaccessible, owing to the soft, muddy and dangerous condition of the roads. According to the recent examination of the matter it was estimated that a load which two horses could draw in a wagon on a good pike would require more than the strength of twenty horses to draw on a rough, muddy road of a character too common in our country. The wear and tear on horses and vehicles will thus be seen to be great on poor roads.

The question comes to every farmer, and in fact to every one who lives in the rural district. Good roads should be the ambition by all means, and there is no better way of securing them than through having the matter up for discussion at every farmers' meeting. Enough money and labor are annually spent on the highways of most of our states to produce good roads, but the result does not yet show that good judgment has been exercised in expending the time, labor and money. This then seems to be the important question for farmers to settle. Another question to decide before spring is whether certain road beds should be surface drained or underdrained with tile. Some roads can be greatly improved by shortening them or cutting off curves and windings. A great deal of unnecessary wear to horses and vehicles would be saved by attending to the roads in time.

Alfalfa for Poultry.

No greater problem presents itself to the average poultry-breeder, says the New Mexico Stock Grower, than what and how to feed with a view to securing the best results from his fowls. Volumes have been written on the subject, all of more or less merit, though it must be admitted that "less" is a good way in the majority. In the alfalfa-growing regions the question is one of easy settlement, however, no system of feeding will produce better results than an unlimited supply of alfalfa. It is the nearest approach to a perfect food that we have, and with a little dry grain (wheat or barley), morning and night, will make hens lay, if there is any lay in them. Of course the best results are obtained where the fowls are allowed to run on the alfalfa patch and pick what they want; but when this is not practicable it can be cut and given to them, when they will work on it industriously. If green alfalfa cannot be had, buy some No. 1 alfalfa hay, run it through a feed-cutter, soak it twelve or twenty-four hours, and mix it in a little bran and middlings. If cut fine enough, say one-fourth to one-half inch, the fowls may be given all they will eat up clean, but if cut in too long lengths, there is danger of it causing what some poultry people call "hard-crop." Alfalfa is also valuable as a feed for ducks. If the ducks can run on the patch they will help themselves, but when this favor cannot be accorded them they will do well on alfalfa cut up and prepared as for chickens.

We have lately seen something in Fort Worth that carries us far towards a full indorsement of the foregoing. In a yard was a fine growth of alfalfa that had sprung up volunteer from where alfalfa hay had been fed to stock, and there was, in the same yard, a flock of chickens having a regular picnic (no pun) picking off and devouring the leaves.

Their Big Sweet Potato.

The Pioneer of Sparks, Ga., says Rev. W. Bryant's big sweet potato takes the ribbon! It was presented the editor Wednesday morning; he had it weighed and it tipped the beam at eight pounds; we verily believe it would have filled a half peck measure.—[Atlanta Journal.

The foregoing is interesting to Texans only in its showing of how small are the sweet potatoes they raise over in Georgia? With us an eight-pound potato would attract no attention whatever, unless it should be that the grower might see fit to cull it from the main heap and throw it aside to go into the seed bank. We have had in THE GAZETTE office this season single sweet potatoes weighing fourteen pounds, and they were regarded as something so very common that comparatively few visitors considered it worth while to ask what they weighed. But then, this is Texas and that is Georgia.

The Poultry Business.

There is money in it, says the Indiana Farmer, but entirely correct management is necessary to get the money out. Not a few people who jump into the poultry business meet with failure, and there are a good many reasons for the way it turns out with them. The chiefest among these reasons, however, may be traced to a non-business principle. People do not go about it in the right way. For instance they depend upon special branches. They ask too much. If a man wants to make a good living he must continue all the branches—he must sell eggs when prices are high and set them when quotations drop. This gives him a profit right along. In fall and early winter, when eggs bring 25 cents a dozen and cost on an average of 12 cents a dozen, there is money in them. In the latter part of winter and early spring, when prices fall, broilers can be raised. Later on in spring chicks can be hatched and raised for the next fall roasters. And ducks, geese and turkeys can be hatched in their season and be marketed before the holidays. Thus an income can be kept up nine months in the year, and if the duck and geese feathers are carefully gathered and sold and every possible advantage taken, there is money and a good living in poultry farming. It is pleasant and independent work, but it is necessary to take in all the branches. No farmer expects success for a single crop. He plants vegetables, grains, fruits; has his cows, hogs and hens. Then, why should a dependence be put entirely on broilers or eggs? Give the business a fair and square chance before you condemn it.

Then, the poultry business, like many other branches of business producing something for sale to the masses, is one upon which an advantageous reputation may be built up. The poulterier who is known to always have fresh eggs of the best quality is the poulterier from whom the people are always ready to buy their supplies. If his eggs invariably pan out in every respect exactly as represented it don't take long for a good name to be built up in his favor, but if, on the other hand, he drives matters as the Montana Farming and Stock Journal says an old Michigan man drove them he can soon set his wags for a change to some other business. It seems, according to our contemporary, that a certain grocer in Bay City tested the eggs offered him by extending to each a severe shaking process. Under this plan he secured in the shaking up a rattle within about half the hen fruit that an old farmer had offered him. The farmer contended that the eggs were fresh and good, but he unhesitatingly pronounced them bad, and ordered them taken away before any of them exploded in his shop.

A few days later and the same old farmer brought in a new supply, and every egg in the lot went smoothly through the test without a rattle. The grocer took the lot willingly, but while there was no rattle about the eggs there was something akin to that kind of thing about the grocer a few hours later when a lady customer sent back a purchase with the blunt information that she wanted raw eggs—not boiled ones. And the eyes of that grocer have not been blessed with the outline of that honest old granger since—the presumption is that he has retired from the poultry business.

ANSWERS TO CORRESPONDENTS.

This department is devoted to answering such questions as may be asked by our subscribers, which may be of general information. Inquiries of personal character that require answer by mail should always have stamps inclosed. Please give full name and postoffice address, in addition to any such signature as "Subscriber," or "A. G. D.," not for publication, but to enable us to communicate promptly with the inquirer. Parties desiring answers by mail must inclose stamp for return postage.

On the Castor Bean.

Some time ago I saw an article in THE GAZETTE on the culture of palma christi or castor bean. Is palma christi and castor bean one and the same thing? Please give me the address of some person engaged in the culture of the castor bean; also let me know where I could find a market for my product should I conclude to go into castor bean culture. Any further information through THE GAZETTE would be thankfully received. C. D. KEMP.

Last Chance, Tex.—Wharton P. O.

The botanical name of the castor bean is Ricinus communis. There is really but one species, though in the course of time several rather strongly marked varieties have branched off from the original species, and seed dealers to better serve their purpose, have attempted to run these varieties out under different specific names. But botanists recognize only a single species. One of the varieties is red podded, and seed men have attempted to put it upon the market under a new specific name as a desirable ornamental foliage plant, which it is. Another variety grows to the height of twenty-five or thirty feet, and they have tried the same game on that variety. But it don't work in science—Ricinus communis is the only castor bean, the same as Solanum Tuberosum is our only Irish potato.

The castor bean seems to have first struck the western hemisphere in Peru, and there the old Monks gave it the local name of palma christi. All our varieties have sprung from that original introduction, hence one variety is as much a palma christi as is another. According to the laws of priority it would seem that palma christi was more justly entitled to figure as the botanical name of the plant than the name it now bears, given it by Linnæus, but be that as it may Ricinus communis is now the scientific name of the castor oil plant the world over.

The smallest growing, blue-stemmed castor bean represents the original plant, and this is the bean cultivated for its oil. The new varieties named yield an oil all right, but as a rule the seeds do not well pop out from the hull—you would have to shell them out in some way, and that would cut off your profits. The kind cultivated for oil readily pops out all its beans on exposure to the sun.

We cannot now point out any one in Texas cultivating the castor bean as a crop, though there are plenty of such persons—not so many as there should be, however. There is a castor oil mill at Weatherford, Texas, which would take your product at the best figures offering anywhere, and no doubt you might get any information desired by addressing "Castor Oil Mills, Weatherford, Texas." We think the concern has circulars prepared and ready for sending out. There is doubtless money for Texas in castor bean culture. A pamphlet on the cultivation of the crop, issued by the St. Louis lead and oil company is now before us. It says "almost any soil that will produce wheat or corn will answer for the castor bean. Where it can be had a sandy loam may be preferable. Wet and heavy soils are not well adapted to its successful culture. One important fact in connection with the culture of castor beans is, that it is one of the most fertilizing crops raised. In this respect it surpasses even clover. Many farmers say that for fertilizing purposes a crop raised upon land is worth several dollars per acre to the land, on account of the additional fertility gained by it.

"The ground should be put into good condition for the seed, as for other crops. One thorough plowing and three or four harrowings with a heavy harrow will be sufficient preparation. If the soil is inclined to be wet it should be thrown into back furrows or lands fifteen or twenty feet in width, and the dead furrows between these lands kept open for drainage off of all surface water. This is not more necessary for the castor bean than for any other crop where the land inclines to wet.

"The ground is now laid off in rows five or six feet apart each way, except that between every sixth or seventh row a distance of about eight feet is left between the rows one way to permit a horse and wagon or a sled to pass, for the purpose of taking the beans as gathered. To hurry germination the seed is usually soaked in warm water twenty-four hours before planting. Eight or ten seeds should be given to each hill, and at this rate a half bushel will plant from eight to ten acres. Plant as soon as danger from frost is over in spring.

"The after cultivation consists in simply keeping down weeds and grass. This aim is chiefly reached by using a horse cultivator or small plow between the rows. It is also necessary to do some work between the plants with hoes, going over the field two or three times, cutting away weeds and grass that cannot be reached by the plow or cultivator and drawing a little mellow earth to the plants. As the plants advance in growth and establish themselves they should be gradually reduced to one in the hill, though two to the hill are quite commonly left. One good, vigorous plant, however, will produce better beans than two and as large a quantity. When the plant has attained to two feet in height it is entirely capable of taking care of itself.

"The harvesting begins as soon as the beans are showing ripeness by a turning brown of some of the pods. You must not wait for the whole bunch to turn brown, as the beans of the ripened pods promptly pop out, and would be lost in the field. When you see one or two browned pods you cut off the entire spike or bunch. Each plant has a number of these, and as they do not all ripen at the same time, the harvest must continue from the time when the first brown pods appear, on till frost puts an end to the crop. The cut spikes are thrown into a wagon or sled and hauled away to the popping yard. The field must be gone over as often as necessity calls for—no spikes must be cut unless they show some ripening pods.

"The popping yard is made on a piece of land near the bean field, and sloping to the south, if possible. Roll the ground down hard and make a fence around the yard by placing boards up against rails laid on forked sticks or posts. The boards should lean outward from the yard. This is to prevent beans from flying beyond the limits of the yard when they pop out from the hulls. Without this fencing precaution many beans would fly away into the grass and be lost.

"The spikes should be occasionally turned over on the yard to expose their under sides to the effects of the sun. Great care should be taken to prevent the beans from getting wet from showers of rain. Dirty beans command a comparatively low price on the market, and sprouted beans are worth nothing at all. When rain is coming on make the spikes into a heap and cover them by some means. After the beans are popped out by the sun rake off the spikes and clean up the beans by running through an ordinary wheat fan. Sack and store away in a dry place until you are ready to send the crop to market.

"After the beans begin to ripen the field should be gone over once or twice a week till frost. In hot, dry weather they ripen more rapidly than in cool, wet weather. Children can perform the work of gathering castor beans, and a large family of children could not be more profitably employed than in taking care of a crop of this kind."

Texas Pecans.

In my last number of the Southern Horticultural Journal is an article on pecan culture copied from the Fort Worth GAZETTE, which I consider the very best thing on the subject that I have yet seen. By this mail I send you a sample of pecans that will tell my idea of a good nut. I have them larger than the samples sent, but do not consider the kernels so good as these in the samples. Next year, if I can thin of it, I will send you a sample of the best pecan known. I wish you would urge it upon all Texans interested in pecan culture that they prepare an exhibit for the next meeting of our state Hort cultural society. Two years ago I took the first premium on pecans at Brenham. I would much like to see at our society's next year meeting pecan exhibits from all parts of the country. E. E. RISIEN.

San Saba, Tex.

The nuts sent are something really grand in the way of pecans. They are the largest pecans we have yet seen—each sample of the half dozen received turned the scales at not far short of one ounce. They also well fill our idea of a really good nut. If there is any fault whatever to work up against them it lies in the fact that the shells are just a little too thick for entire conformity to the popular standard. They are not what could be termed "thick shelled pecans," yet, at the same time, they are not acceptable as "paper shells." The most popular pecan on the market nowadays has a shell so thin that you can take two nuts in the hand and crush them one against the other by a grip that calls for no particular effort. The samples sent might be crushed in this way, but not easily.

Mr. Risien's suggestion with reference to working up a full pecan exhibit is certainly a good one. Texas is the natural home of the pecan. She produces all the grades and varieties known, but as yet her people scarcely know which of these varieties would take best on the general market. A full exhibition and a general comparison of notes might be of great value to us as settling the question with reference to what character of pecans we ought to grow. The sooner this thing can be attended to the better, for the beginning of pecan culture is something that we ought not to make any mistake in. It is very unlike the culture of sweet potatoes or something of that kind, wherein if we make a mistake this year we can correct it in the next. When we start a pecan grove we have started something to stay as started, and the man who started it, if he has made a mistake will never live to see the mistake fully corrected, so far as results are concerned. The new and better grove put in to take the place of the one discarded will hold its profits in reserve for the next generation.

A Book on Hop Culture.

A short time ago your agricultural department gave us an article on hop culture for Texas. Can you favor me with the name of some good and practical work on hop culture?
Palestine, Tex. C. R. COCKLE.

We have had four additional letters on the same subject, and so take this method of making a sweeping reply to all concerned.

So far as we know there is no book treating specially on hop culture. In the United States patent office, report for 1857, there is quite a lengthy paper on the subject—about the best thing of the kind in the English language, perhaps. Wilson's Rural Cyclopedia, published later, has quite an exhaustive paper on the same subject; also Phillips History of Cultivated Vegetables. The only work in our library touching directly on hop culture for the Southern states is Resources of Southern Fields and Forests by Dr. F. P. Porcher, published by Walker, Evans & Cogswell, Charleston, S. C., in 1869. This work is possibly still in print.

The Dwarf Lima Bean.

Of late I have seen a good deal in the papers about a dwarf lima or butter bean that calls for no sticking. Can you give us particulars with reference to it through your excellent agricultural department of the Fort Worth GAZETTE?
REGULAR READER

Blanco county, Texas.

We have raised it and must say that we like it reasonably well, though it does not bear near so many beans as do the old-fashioned vining varieties. Seedsmen claim for it that it flourishes and thrives in the hottest and dryest climates, and even that it succeeds well in California without irrigation, where it is grown by the train-load. They say it is a native of South America, but, of course, this is neither here nor there with us. It would probably succeed as well with us in Texas as in any other portion of the world. For all further particulars see the seed catalogues.

Scions and Cuttings.

Do you consider it the better plan to take on cuttings or scions in the fall, to be used next spring, burying them in the ground till you are ready to use them? N. L. BANKS.
Bandera County, Tex.

Not exactly this fall, but we'd take off and bury them in the course of the winter, to guard against their becoming lively and sappy in some warm spell that might happen to come on. About mid-winter is probably the best time for putting them underground.

POPULAR SCIENCE.

Hop Fibre—New Insulator—A Bad Smell in Germany—Cheap Aluminum—Meteor Mountains—Lightning and Rain Signs.

On Monday evening, 15th, the moon will be in conjunction with the planet Jupiter, and on Tuesday evening, 16th, with the planet Mars. There are no other astronomical phenomena of importance for this week.

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The hop is now receiving a great deal of attention in France as a fibre plant. It makes fine cordage and is said to turn out a paper stock equal in every respect to the best manilla. Bleached properly it works to perfection as a stock for the finer papers. The French people are pronouncing upon it as a most valuable crop without taking the fruit at all into consideration.

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The discovery of a new insulating material to be employed in association with electricity is reported from London. It is said to have all the qualities of gutta percha, but with a higher dielectric resistence. The discovery was made by Dr. Purcell Taylor, a name well known to scientists. The doctor calls it "purcellite." They say it is exceedingly tough and elastic, capable of being given any color, and of being made either flexible or rigid, and to be only one-fortieth as expensive as gutta percha. We have no information with reference to it beyond this mere announcement.

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The German chemists, who not long ago discovered the sweetest substance known to the world, which the called saccharine, are said to have reached the other extreme in the discovery of the worst smelling substance ever before dreamed of by any man's philosophy. The cities in which the experiments have been going on have promptly closed down on their work. The new product has been obtained from the reaction of sulphurated hydrogen on acetone. They got an entirely new body, which seems to be monosulphurated acetone, or thioketone. It was impossible, however, to obtain the substance pure on account of its odor, which makes all other foul smells sweet by comparison, and entitles this compound—whatever it is—to rank as the worst smelling substance known. In the attempts made to purify the product, with every precaution to prevent its escape, the atmosphere about the laboratory was so infected to a distance of at least a quarter of a mile that a storm of complaint from the citizens of the town made it necessary to abandon the investigation.

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One might think that nothing of importance could spring from this newly discovered bad smell stirred up in Germany, but already its usefulness is being widely discussed in the war department of that country. They claim that when the substance has been worked down by science into manageable shape it will be inclosed in shells to be exploded in the camps and fortresses of the enemy. While this style of warfare may prove wonderfully effective it will certainly not stand out with much prominence as a resort to any new principle in animal warfare.

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It has long been known that a valuable metal called aluminum existed in common clays, but a way of getting it out cheaply could not be found. Since 1885, many prominent chemists have been devoting their whole time to delving after it. At last Mr. Eugene H. Cowles of Cleveland, Ohio, claims to have made the much coveted discovery. According to the New York Times we are now to have a pure metal made by a new process that is radically different from anything yet known to metallurgists—a process that is ridiculously simple in operation and almost theoretically perfect. By reason of two chemical discoveries it is found that the pure metal can be extracted direct from the clay. This can be done without the use of electrical heat. When operated on as large a scale as that on which iron is produced, aluminum will be produced at a cost permitting it to sell at $200 per ton, a price less than the present price of copper. Extensive works for turning out the new metal are to be put into operation without delay.

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The height of the great mountain peaks in Mexico has just been settled by a scientific expedition sent out for that purpose under Angelo Heilprin. It is now fully established that the highest peak in Mexico is Orizaba or the "Star Mountain," and not Popocatepetl as has heretofore been supposed, the former being 700 feet the highest (18,200 feet above the sea). Popocatepetl comes next, then Ixtaccihuatl, which is 300 feet lower than Popocatepetl. Measurements of other peaks further north are soon to be taken with a view to deciding upon which is the highest peak in North America. From the present outlook scientists are beginning to feel that Mexico will carry off the palm. There is now remaining but one chance for beating Mexico, and that lies in Alaska.

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A gentleman came to the writer of these notes a few days ago and said lightning had often struck on his place, and therefore he felt sure that there were "minerals" in the ground. We have heard that kind of thing often before, but it is all nonsense. No metals (what the man meant) have any special attractions for lightning, where they lie in an isolated kind of condition. When a "thunder cloud" comes up heavily charged with electricity, that electricity leaps to the earth at the first point where is offered the most direct conductor. For instance, if your place slopes off in the direction whence the cloud is coming there is danger, but if it happens to slope the other way, and there is higher land or high trees between you and the approaching cloud, there is no danger whatever. When lightning leaves a cloud for the earth it has its course marked out at starting, as it were; that is, it starts for the earth on the route of least resistance, or over a way that will bring it to something directly connected with the earth, between which and the cloud there is the shortest space for it to leap. Metallic minerals in the earth have no more attraction for lightning